

REMARKS

Claims 1-6 have been rejected by the Examiner under 35 USC 102(b) as being anticipated by Hackleman, U.S. Patent 5,640,183. This rejection is respectfully traversed.

The present invention is directed to a method and apparatus for printing a substrate with an ink jet printing device comprising a first printing stage in which a strip of pixel rows is provided with ink drops, whereafter the print head is displayed in a direction substantially parallel to the pixel columns, and a second printing stage in which the strip is provided with supplementary ink drops, wherein the print head is displayed over a distance which is not selected from a plurality of distances but which is a fixed distance such that the same is always substantially equal to the width of one pixel row. According to the present invention, it has been found that the negative effect on printing results induced by distributed faulty nozzles can be more adequately masked by applying a fixed displacement of the print head instead of using a displacement that has to be chosen for each subsequent print swath. Thus, in the method and apparatus of the present invention, the distance over which the print head is displayed before the next print swath is made is not selected out of a plurality of distances but is a fixed distance that is determined, that is predetermined even before the printing starts. Surprisingly, the Applicants have found that the negative effect on printing results induced by distributed faulty nozzles can be more adequately masked by applying a fixed displacement of the print head instead of using a displacement that has to be chosen for

each subsequent print swath (see page 2, lines 20-26 of the present application). A fixed displacement is in complete contrast with the teachings disclosed by the Hackleman patent.

In rejecting claims 1-6 as being anticipated by the Hackleman patent, the Examiner argues that the Hackleman reference shows a second printing stage in which the strip is provided with supplementary ink drops, wherein the print head is displaced over a distance which is not selected from a plurality of distances but which is a fixed distance such that the same is always substantially equal to the width of one pixel row. However, this assumption is based on a wrong interpretation of the Hackleman patent. The Hackleman patent states in the Summary of the Invention that the nozzles selected for printing a particular swath are pseudo-randomly or non-randomly shifted for the next swath. This would strongly suggest that the selection process disclosed in the Hackleman patent is applied swath-by-swath and not page-by-page. This strong suggestion is made explicit and thus is positively acknowledged by referring to the working embodiments. Thus, the example given in Col. 4, lines 4-18, makes it clear that a first pass of the print head across the medium nozzles 1-100 (see Fig. 5 for nozzle numbering) are selected. In the next swath a different set is selected, that is, nozzles 2-98 (see lines 7-10), and yet in another pass a different set of nozzles is selected, that is, nozzles 3 through +3 (lines 10-11). The fact that for each new pass a new set of nozzles is selected certainly acknowledges the randomizing of selected nozzles in each pass. In short, it is readily clear to one skilled in the art that

before each and every print swath a new selection of nozzles is made and that a selection, once made, does not remain fixed during all subsequent swaths in the printing of a page.

The Examiner refers to the example in Col. 5, lines 1-23, to allege that the paper drive remains fixed during the printing of a page. In this example, in lines 12-13, it is stated that the offset for each swath is decided upon in step 603 (see Fig. 7). Indeed, from this wording alone, it is not clear whether “for each step” means that one selection is meant that will be copied into each step of the page to be printed (as the Examiner alleges) or that for each step a new selection is made. However, Hackleman further states that the offset is chosen from a particular swath (line 16) and thus not for all swaths. In addition, the patentee makes it clear that after this particular swath is printed, the complete process is repeated in order to complete the page (see lines 21-23). Thus, for the next swath, step 603 will also be performed. This means that a new selection of nozzles will be made for the next swath. Thus, it is perfectly clear from the skilled practitioner that Hackleman teaches to make a new selection for a new set of nozzles and thus for an offset in paper shift, each and every time a new print swath is going to be printed, even within the same page to be printed.

It is the Applicants’ recognition that such a selection for each and every swath has important disadvantages and in particular does not provide for an optimal masking of certain print head deviations. The Applicants have invented a method and apparatus wherein the distance over which the print

head is displaced before a next printing stage is not selected out of a plurality of distances, but rather as always the same distance. Surprisingly, this provides for better masking of certain print head deviations and has some additional advantages as pointed out on page 3, lines 3-6 of the present application. A detailed description of the disadvantages of the Hackleman patent can be found on pages 1 and 2 of the present application.

With respect to the Examiner's rejection of claims 2-6, it should be noted that since claims 2-5 are dependent from claim 1, which is considered allowable over the prior art, and since claim 6 contains all of the limitations of claim 1, it is believed that for the same reasons as set forth hereinabove, claims 2-6 are also patentably distinguishable over the Hackleman patent.

Accordingly, in view of the above Remarks reconsideration of the rejection and allowance of the claims of the present application are respectfully requested.

Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Mr. Joseph A. Kolasch (Reg. No. 22,463) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By


Joseph A. Kolasch, #22,463

JAK/njp

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000